Scala Scripting

Scala By the Bay, San Francisco, 12 Nov 2016

Scala has a code-size gap

Scala REPL: lightweight, works great for < 1 line programs, more is problematic

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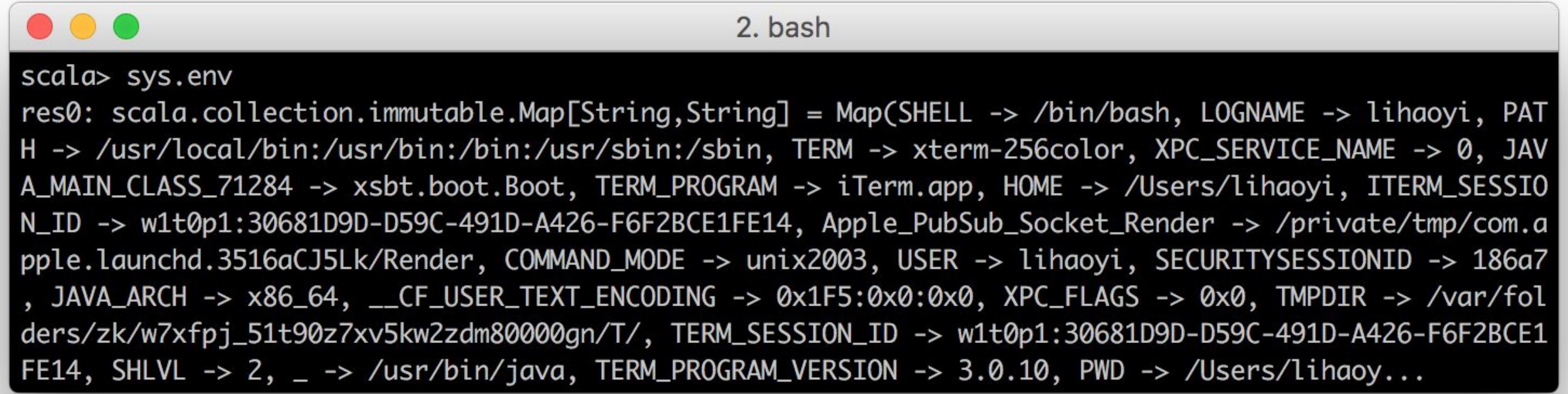

```
scala> sys.env
res0: scala.collection.immutable.Map[String,String] = Map(SHELL -> /bin/bash, LOGNAME -> lihaoyi, PAT
H -> /usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin, TERM -> xterm-256color, XPC_SERVICE_NAME -> 0, JAV
A_MAIN_CLASS_71284 -> xsbt.boot.Boot, TERM_PROGRAM -> iTerm.app, HOME -> /Users/lihaoyi, ITERM_SESSIO
N_ID -> w1t0p1:30681D9D-D59C-491D-A426-F6F2BCE1FE14, Apple_PubSub_Socket_Render -> /private/tmp/com.a
pple.launchd.3516aCJ5Lk/Render, COMMAND_MODE -> unix2003, USER -> lihaoyi, SECURITYSESSIONID -> 186a7
, JAVA_ARCH -> x86_64, __CF_USER_TEXT_ENCODING -> 0x1F5:0x0:0x0, XPC_FLAGS -> 0x0, TMPDIR -> /var/fol
ders/zk/w7xfpj_51t90z7xv5kw2zdm80000gn/T/, TERM_SESSION_ID -> w1t0p1:30681D9D-D59C-491D-A426-F6F2BCE1
FE14, SHLVL -> 2, _ -> /usr/bin/java, TERM_PROGRAM_VERSION -> 3.0.10, PWD -> /Users/lihaoy...
```

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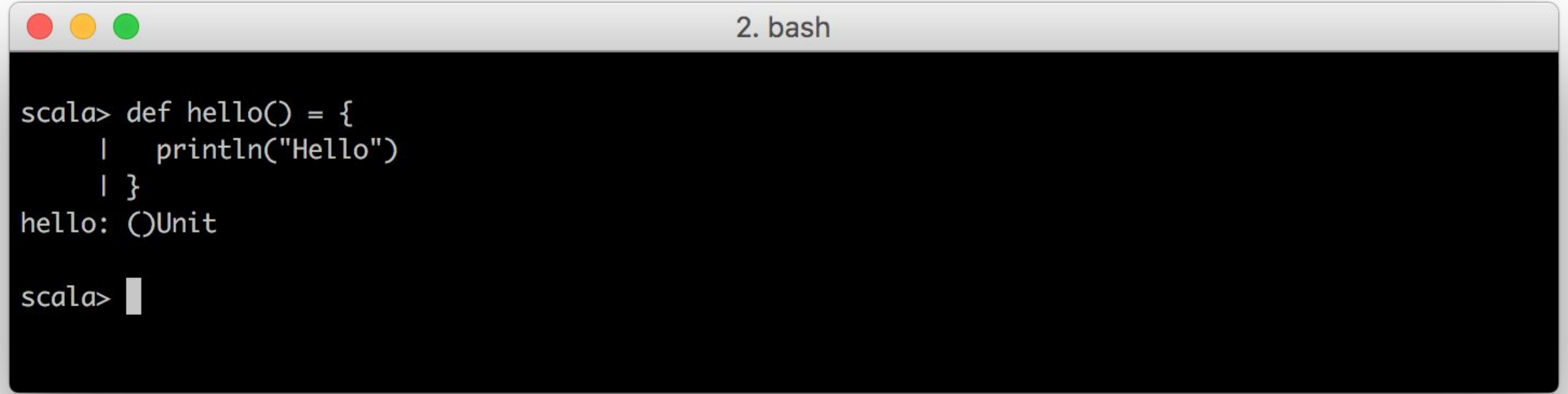

```
scala> def hello() = {
     |   println("Hello")
     | }
hello: ()Unit

scala> 
```

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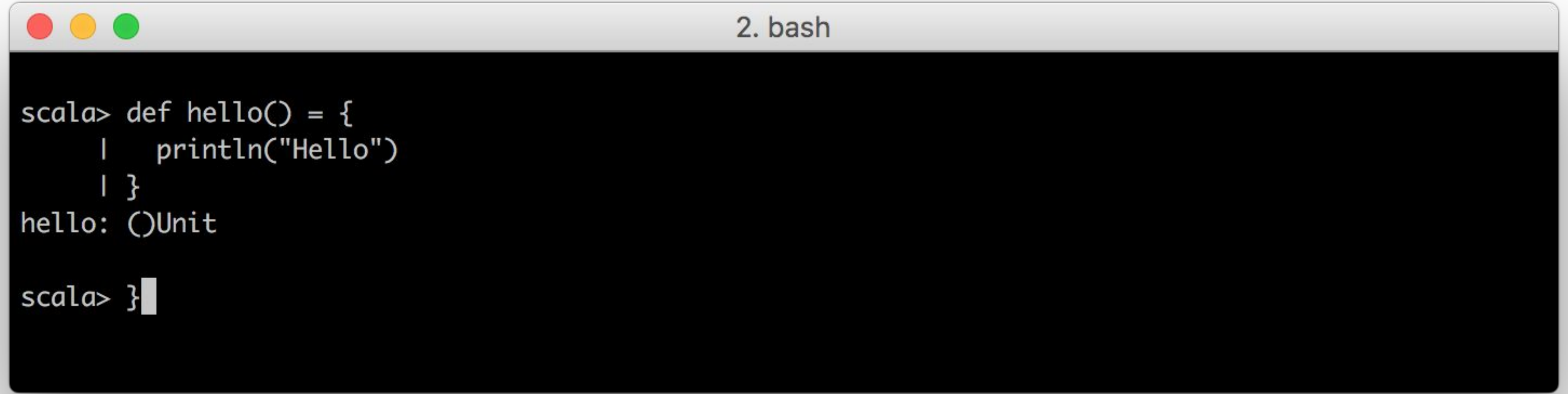

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scala> }
```

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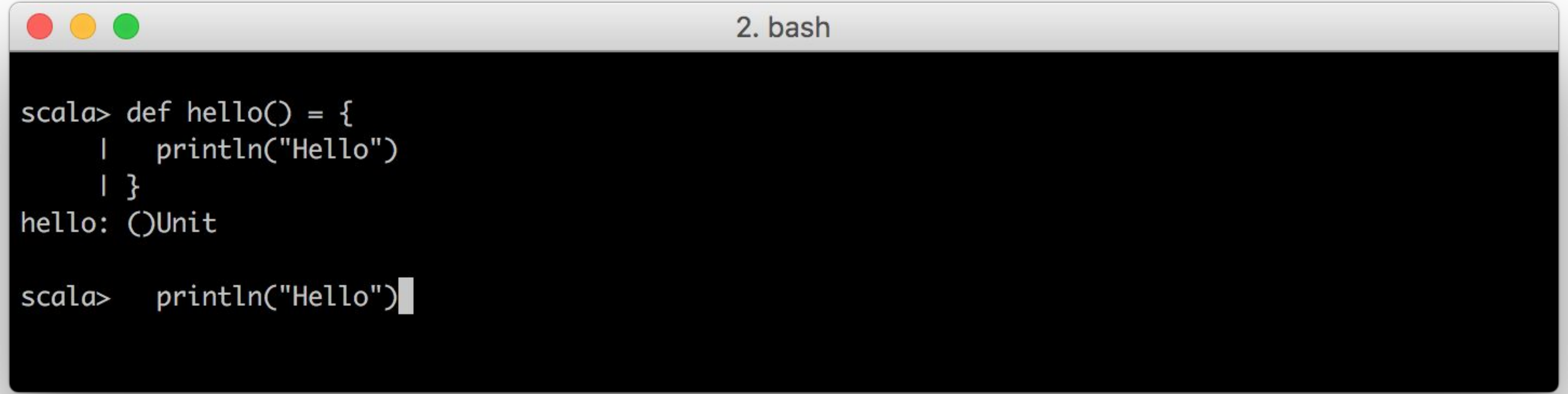

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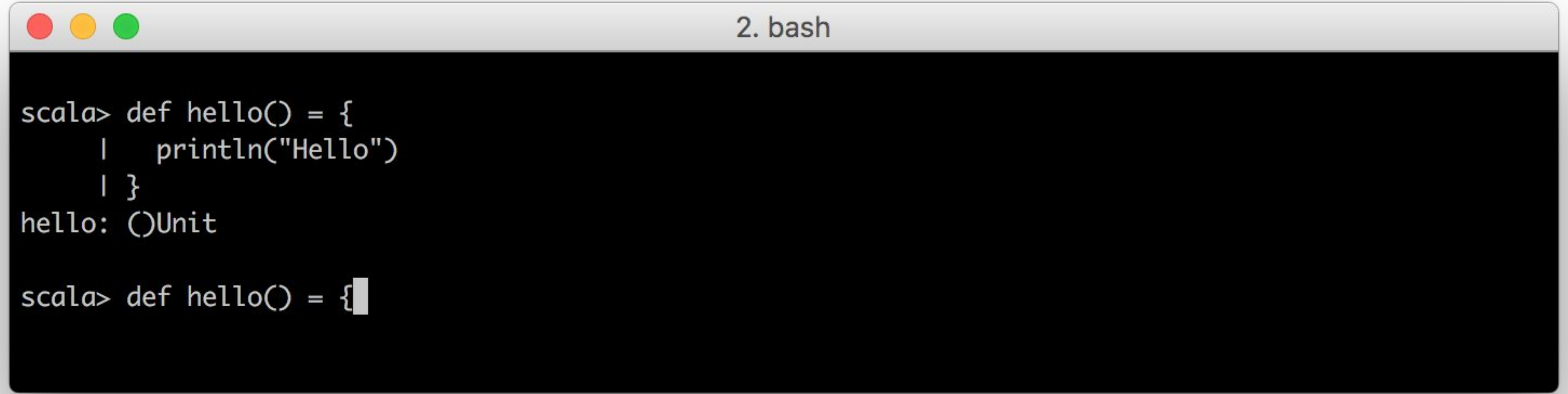

```
scala> def hello() = {
     |   println("Hello")
     | }
hello: ()Unit

scala> def hello() = {
```

Scala has a code-size gap

SBT: Works great for 1,000 - 100,000 line programs, overkill for small scripts

Scala has a code-size gap

```scala
object Main{
  def main(args: Array[String]): Unit = {
    println("Hello")
  }
}
```

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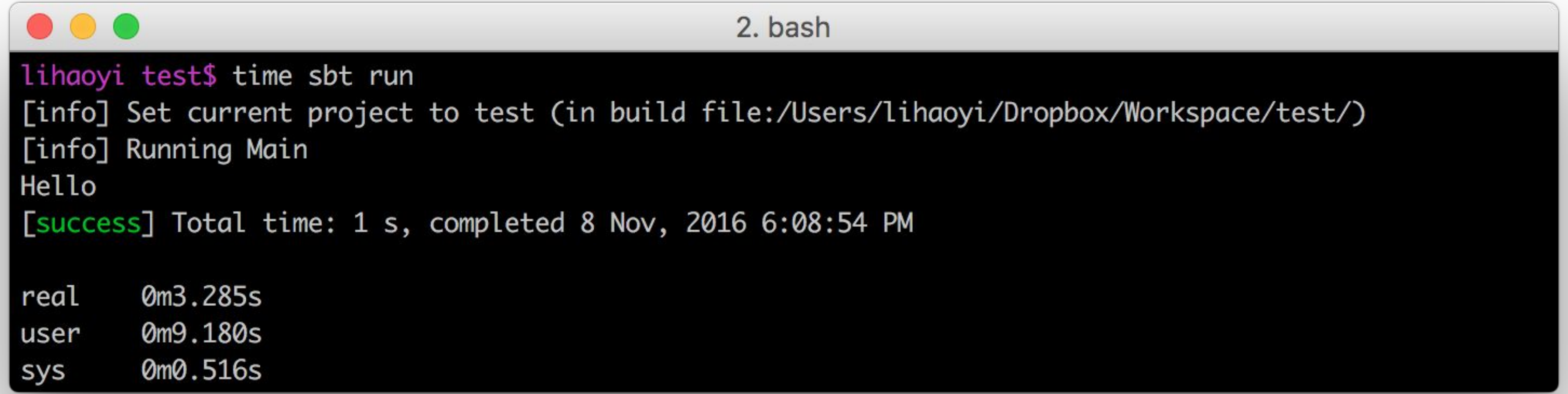

```
lihaoyi test$ time sbt run
[info] Set current project to test (in build file:/Users/lihaoyi/Dropbox/Workspace/test/)
[info] Running Main
Hello
[success] Total time: 1 s, completed 8 Nov, 2016 6:08:54 PM

real	0m3.285s
user	0m9.180s
sys	0m0.516s
```

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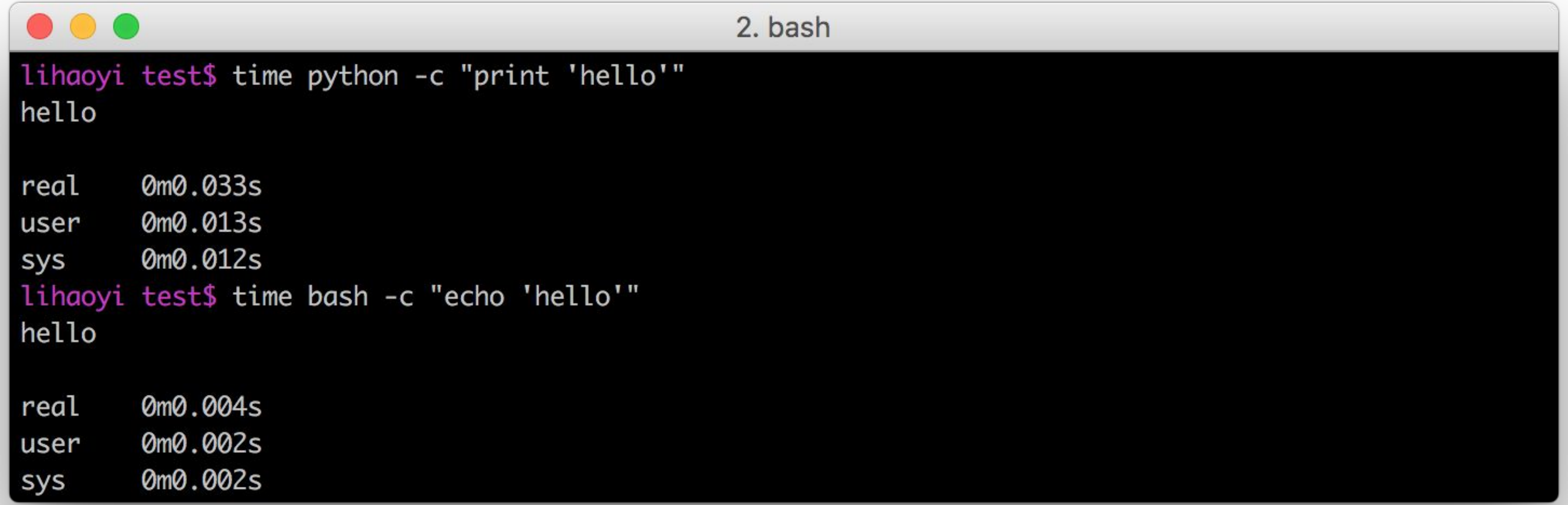

```
lihaoyi test$ time python -c "print 'hello'"
hello

real	0m0.033s
user	0m0.013s
sys	0m0.012s
lihaoyi test$ time bash -c "echo 'hello'"
hello

real	0m0.004s
user	0m0.002s
sys	0m0.002s
```

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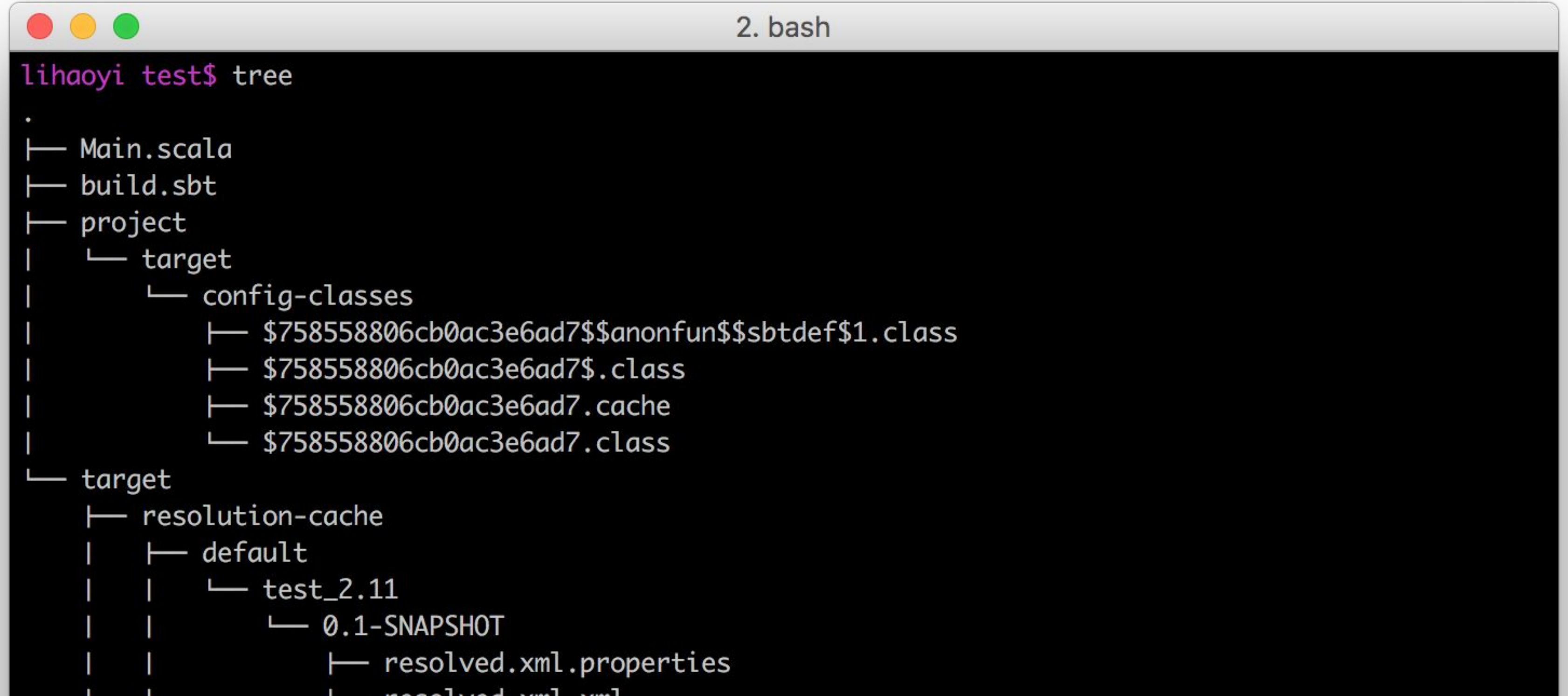

```
lihaoyi test$ tree
.
├── Main.scala
├── build.sbt
├── project
|   └── target
|       └── config-classes
|           ├── $758558806cb0ac3e6ad7$$anonfun$$sbtdef$1.class
|           ├── $758558806cb0ac3e6ad7$.class
|           ├── $758558806cb0ac3e6ad7.cache
|           └── $758558806cb0ac3e6ad7.class
└── target
    ├── resolution-cache
    |   ├── default
    |   |   └── test_2.11
    |   |       └── 0.1-SNAPSHOT
    |   |           ├── resolved.xml.properties
```

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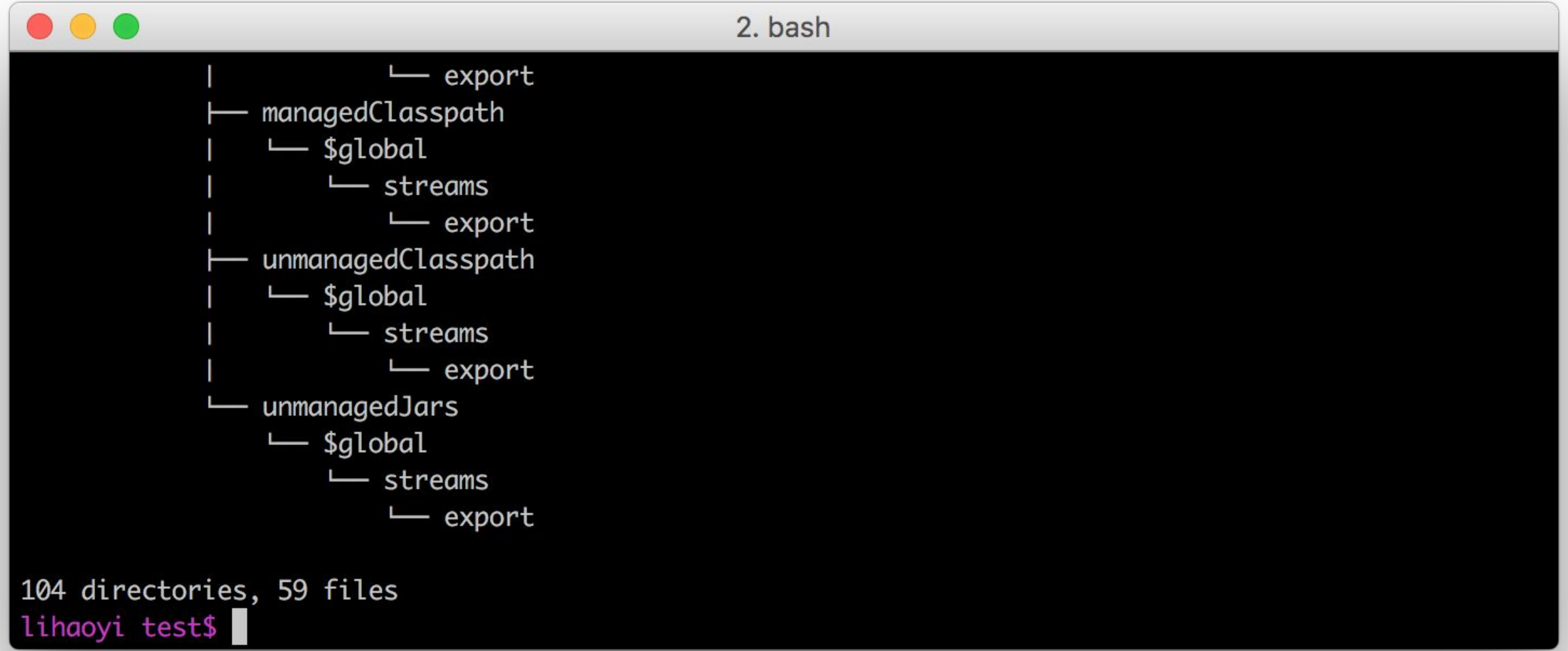

```
    |           └── export
    ├── managedClasspath
    |   └── $global
    |       └── streams
    |           └── export
    ├── unmanagedClasspath
    |   └── $global
    |       └── streams
    |           └── export
    └── unmanagedJars
        └── $global
            └── streams
                └── export

104 directories, 59 files
lihaoyi test$ 
```

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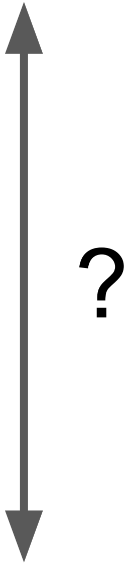

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Ammonite Scala REPL/Scripts

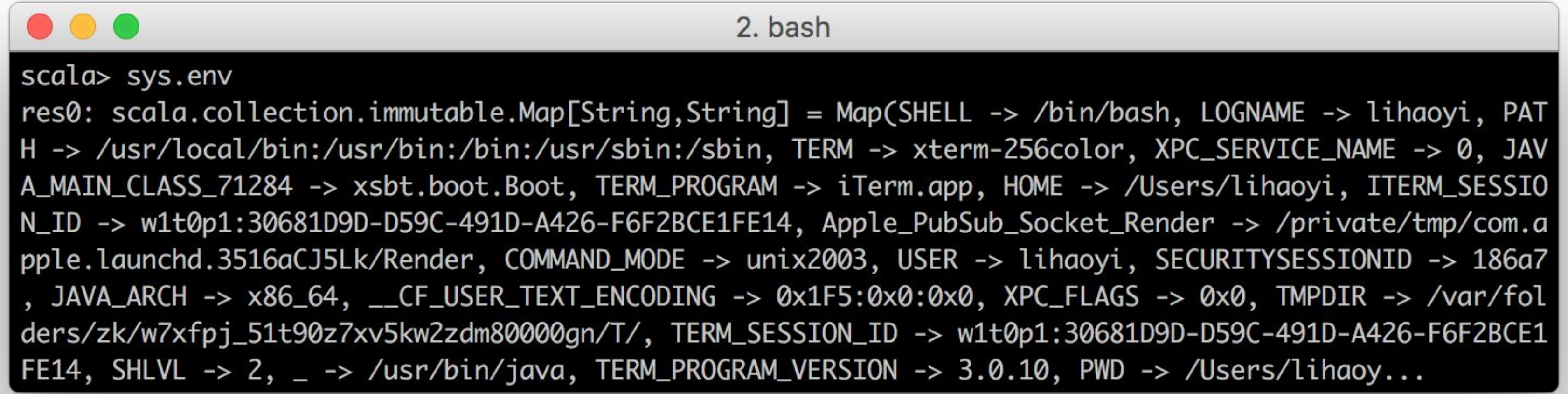
SBT: Works great for 1,000 - 100,000 line programs, overkill for small scripts

Ammonite: Scala Scripting

lihaoyi.github.io/Ammonite

Ammonite-REPL

Like the Scala REPL,



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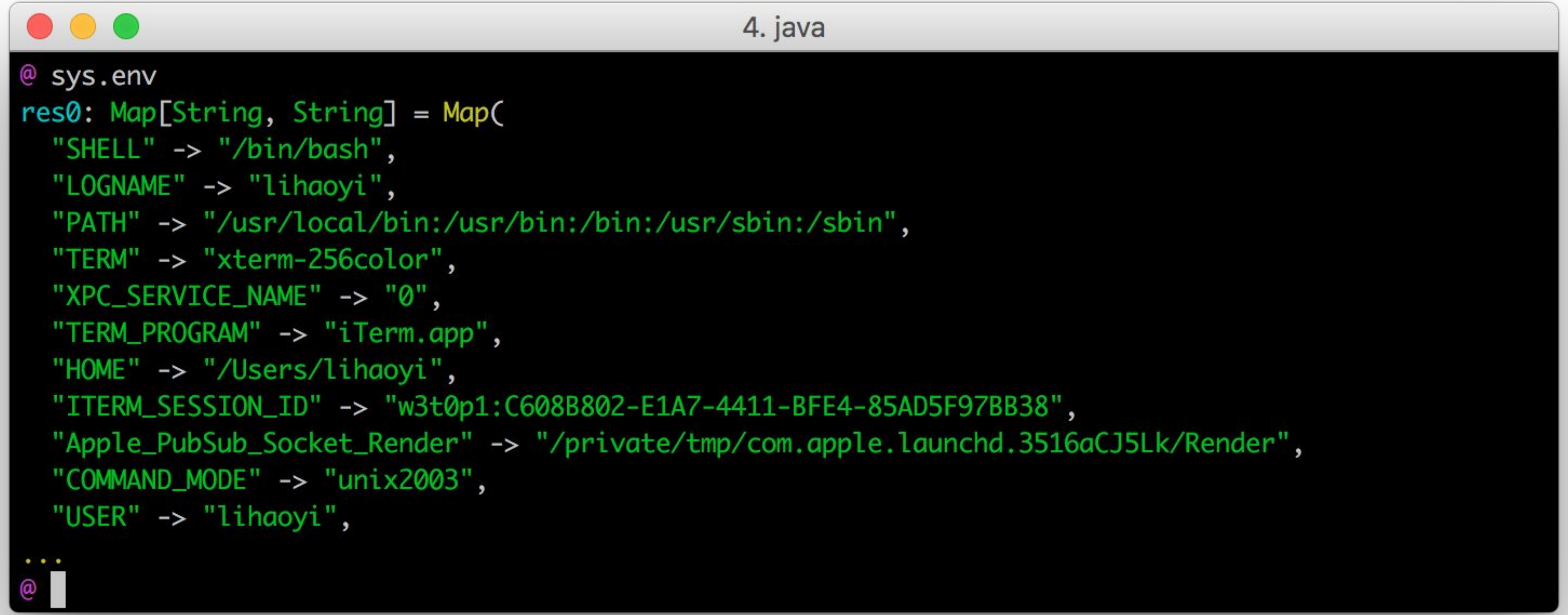
FE14, SHLVL -> 2, _ -> /usr/bin/java, TERM_PROGRAM_VERSION -> 3.0.10, PWD -> /Users/lihaoy...
```

Ammonite-REPL

Like the Scala REPL, but better

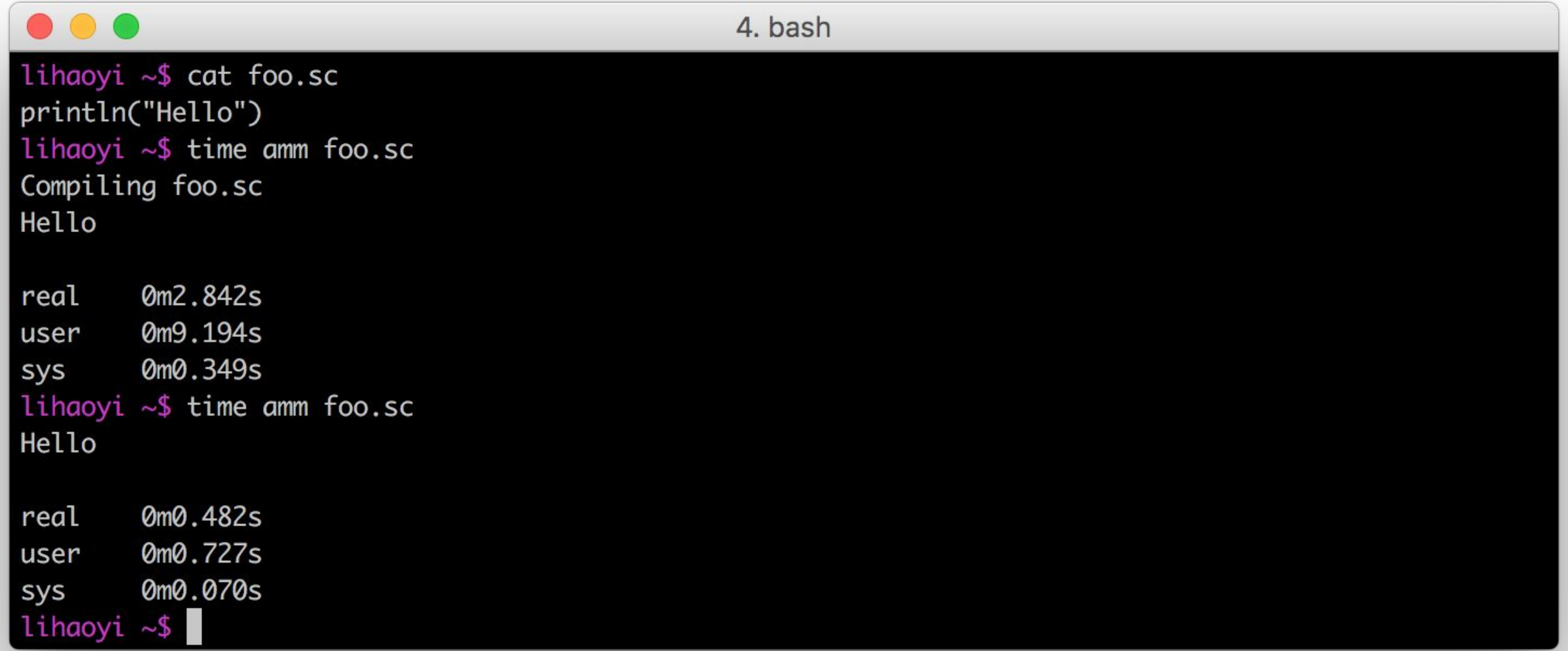


```
@ sys.env
res0: Map[String, String] = Map(
  "SHELL" -> "/bin/bash",
  "LOGNAME" -> "lihaoyi",
  "PATH" -> "/usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin",
  "TERM" -> "xterm-256color",
  "XPC_SERVICE_NAME" -> "0",
  "TERM_PROGRAM" -> "iTerm.app",
  "HOME" -> "/Users/lihaoyi",
  "ITERM_SESSION_ID" -> "w3t0p1:C608B802-E1A7-4411-BFE4-85AD5F97BB38",
  "Apple_PubSub_Socket_Render" -> "/private/tmp/com.apple.launchd.3516aCJ5Lk/Render",
  "COMMAND_MODE" -> "unix2003",
  "USER" -> "lihaoyi",

...
@
```

Ammonite-Scripts

Write Scala without the fuss



```
lihaoyi ~$ cat foo.sc
println("Hello")
lihaoyi ~$ time amm foo.sc
Compiling foo.sc
Hello

real	0m2.842s
user	0m9.194s
sys	0m0.349s
lihaoyi ~$ time amm foo.sc
Hello

real	0m0.482s
user	0m0.727s
sys	0m0.070s
lihaoyi ~$
```

Demo: Ammonite REPL

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Ammonite REPL: lightweight, works great for 1 - 10 line programs

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Ammonite Scripts: works for 10 - 1,000 line programs

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Demo: Ammonite Scripts

Like running scripts with the `scala` command but...

Can you use third party libraries?

-

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Can you use third party libraries?

-

Can you import other scripts?

-

Like running scripts with the `scala` command but...

Can you use third party libraries?

- Download jar yourself, download transitive dependencies, use `-cp`, ...

Can you import other scripts?

- No

Like running scripts with the `scala` command but...

Can you use third party libraries?

- `import $ivy.`com.lihaoyi::scalatags:0.6.2``

Can you import other scripts?

- `import $file.foo`
- `import $file.foo.bar`

Like running scripts with the `scala` command but...

Can you use third party libraries?

- `` import $ivy.`com.lihaoyi::scalatags:0.6.2` ``
- `libraryDependencies += "com.lihaoyi" %% "scalatags" % "0.6.2"`

Can you import other scripts?

- `import $file.foo`
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Like running scripts with the `scala` command but...

Can you use third party libraries?

- `` import $ivy.`com.lihaoyi::scalatags:0.6.2` ``
- `libraryDependencies += "com.lihaoyi" %% "scalatags" % "0.6.2"`

Can you import other scripts?

- `import $file.foo // loads foo.sc`
- `import $file.foo.bar // loads foo/bar.sc`

Demo: Ammonite Script Imports

Demo: Ammonite Website

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Use Cases

www.lihaoyi.com

www.lihaoyi.com/Resume

github.com/lihaoyi/Ammonite/blob/master/ci/build.sc

Next Steps

Next Steps: need more usage

- Currently about 6-7k downloads a month
- More users = more edge cases get found, more help fixing bugs,
- More users = more info to help set direction of development

Next Steps: need more contributors!

- Lots of people contributing fixes, but still mostly me driving development
- Script-runner was mostly built by two GSOC interns, but they've moved on
- Need more people to sustainably drive project forward

Next Steps: concrete tasks

- IntelliJ support for scripts
- Convert autocomplete to use 2.12 REPL's improved autocomplete
- Experiment with using shapeless for more stable pretty-printing
- Better SBT integration: re-use compiler settings? Plugins?
- Spark support??

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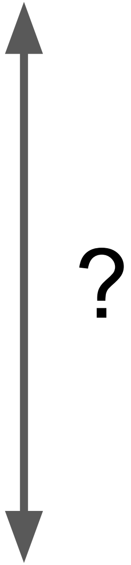

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Q & A